

a layer of insulating material, on top of said substrate, said layer of insulating material having a first edge;

said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;

a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; and a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs; which method comprises the steps of:



- (a) contacting said sensor with a sample suspected of containing an analyte; and
- (b) scanning the voltage from a negative voltage to a positive voltage such that the scanned voltage is of a range where said analyte should be oxidized or reduced at said microband electrode.
- 36. (Once amended) A method of utilizing a microband electrode array sensor comprising a substrate having a first edge;
 - a layer of insulating material on top of said substrate, said layer of insulating material having a first edge;

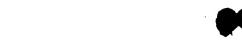
said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;

a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers and;

- a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs; said method comprising the steps of:
- (a) contacting said sensor with a sample suspected of containing an analyte; and
- (b) performing anodic stripping voltammetry.







- 38. (Once amended) A method of detecting the presence and measuring the concentration of analytes in a sample, the method comprising the steps of:
 - (a) contacting a microband electrode array sensor comprising:
 - a substrate having a first edge;
 - a layer of insulating material on top of said substrate, said layer of insulating material having a first edge;
 - said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;
 - a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; and
 - a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs;

with a sample suspected of containing an analyte;

- (b) applying an electrical potential to the sensor, and;
- (c) measuring the electrical current flowing through the sensor.
- 42. (Once amended) The method of claim 38 wherein the analyte is detected by:
 - (a) applying a positive voltage for a sufficient time to allow for an analyte to be oxidized onto the microband electrode; and
 - (b) scanning the voltage in a negative direction to reduce the plated analyte off the microband electrode.
- 43. (Once amended) The method of claim 38 wherein the analyte is detected by:
 - (a) applying a negative voltage for a sufficient time to allow for an analyte to be reduced onto the microband electrode; and
 - (b) scanning the voltage in a negative direction to oxidize the plated analyte off the microband electrode.









- 45. (Once amended) The method of claim 44 wherein in the multi-layer microband electrode sensor each of said substrates is planar.
- 46. (Once amended) A method for performing electrochemical measurements on a sample comprising the step of contacting a sample suspected of containing an analyte with a microband electrode array sensor comprising:

a substrate having a first edge;

a layer of insulating material of top of said substrate, said layer of insulating material having a first edge;

said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;

a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge; and

a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs; and

wherein the sensor is/integrated into a channel.

- 49. (New) The method of claim 34 wherein said microband electrode array sensor wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.
- 50. (New) The method of claim 34 wherein the exposed surface of each of said microband electrodes has a thickness of between about .03 and 5 micrometers.
- 51. (New) The method of claim 34 wherein the exposed surface of each of said microband electrodes has a thickness of between about .1 to about .2 micrometers.
- 52. (New) The method of claim 34 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.
- 53. (New) The method of claim 52 wherein said adhesion layer comprises chromium.





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- (New) The method of claim 36 wherein said microband electrode array sensor wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.
- 55. (New) The method of claim 36 wherein the exposed surface of each of said microband electrodes has a thickness of between about .03 and 5 micrometers.
- 56. (New) The method of claim 36 wherein the exposed surface of each of said microband electrodes has a thickness of between about .1 to about .2 micrometers.
- 57. (New) The method of claim 36 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.
- 58. (New) The method of claim 57 wherein said adhesion layer comprises chromium.
- 59. (New) The method of claim 38 wherein said microband electrode array sensor wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

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- 60. (New) The method of claim 38 wherein the exposed surface of each of said microband electrodes has a thickness of between about .03 and 5 micrometers.
- 61. (New) The method of claim 38 wherein the exposed surface of each of said microband electrodes has a thickness of between about .1 to about .2 micrometers.
- 62. (New) The method of claim 38 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.
- 63. (New) The method of claim 62 wherein said adhesion layer comprises chromium.